



## Environment and Natural Resources Trust Fund

### 2022 Request for Proposal

#### General Information

**Proposal ID:** 2022-096

**Proposal Title:** Mobile Lab Science Comes to You

#### Project Manager Information

**Name:** Lee Furuseeth

**Organization:** Headwaters Science Center

**Office Telephone:** (218) 444-4472

**Email:** director@hscbemidji.org

#### Project Basic Information

**Project Summary:** A mobile science lab and off-site programs allow structured process for informal education presenting children (students) and adults opportunities to think, formulate, organize, and present science phenomena.

**Funds Requested:** \$134,000

**Proposed Project Completion:** June 30 2024

**LCCMR Funding Category:** Small Projects (H)

**Secondary Category:** Environmental Education (C)

#### Project Location

**What is the best scale for describing where your work will take place?**

Region(s): NW

**What is the best scale to describe the area impacted by your work?**

Region(s): NW

**When will the work impact occur?**

In the Future

## Narrative

**Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

I hear and I forget. I see and I remember. I do and I understand.” Chinese Proverb. These words, while not the exact translation, capture the spirit of Headwaters Science Center’s (HSC) “Science You Can Touch”, by way of “hands on learning” approach to science. For the past twenty-seven years this has been our guiding principle, residing at the core of our tactile teaching and learning style. By touching HSC means all the senses: hearing, tasting (when appropriate), smelling, seeing and feeling.

After more than 12 mounting months of remote and virtual learning, there has never been a greater need to “experience” high-level science. Many teachers, students, and parents are reporting a dramatic increase in screen time learning, which is passive by nature and often leaves out those who thrive more with actively engaging science. This, in an attempt to focus on reading and mathematics which are much more easily transmittable over a distance. Thus learning science, in this manner when it has occurred, has too often been void of the sensory input that is essential to genuinely effective understanding.

HSC believes it is time to bring science to you (students and adults), in a mobile lab.

**What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

HSC proposes bringing science to the community, through clubs, classes, science fairs and an actual laboratory/museum on wheels ready to roll into remote underserved locations. A mobile environmental science lab with all the amenities, allowing learning to occur on the spot at sites around our Northern Minnesota service area. Our proposed laboratory on wheels will be self-contained, service oriented, with personalized exhibits and capacity to study then teach natural resources science. It will don solar panels to power laboratory equipment and act as a demonstration for sustainability with renewable resources at its central theme.

HSC will help teachers/schools get students out of the classroom and out into the fields, lakes, and rivers, where students will use science to explore water quality, shoreline habitation, and the health of the aquatic and terrestrial inhabitants. Venturing further from the school, HSC proposes meeting busloads of students at local lakeshore and rivers for catching, dissecting, and studying fish to determine local water condition. Shores and riverbanks will be opportunities to investigate the effects of human interaction with natural habitat.

HSC will rendezvous with students at Spearhead Lake or Lake Bemidji, in cooperation with the Mississippi Audubon Society and Lake Bemidji State Park.

**What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state’s natural resources?**

Goals for environmental club participants and community education students are:

- Create and fully develop personal field journals.
- Become adept at recording field data.
- Connect people to animals through nature.
- Create awareness of aquatic invasive species, nutrient loading, shore land alteration.
- Demonstrate connections between human practices, and use of personal products such as road salt, or petroleum products, and the environment.
- Articulate an understand for the connection between watershed management practices and water quality.

Our primary goal for the proposed mobile science lab, science club and classes is to deliver high quality, hands-on environmental and STEM education.

## Activities and Milestones

### Activity 1: Scientists in Residence: Mobile, Bringing Science To You

**Activity Budget:** \$34,000

**Activity Description:**

HSC plans to stage eight “Scientists in Residences” events, across three school seasons during each of the two years, fall and winter having one residence, and two in spring. A residence will be a school/organization, or a mutually agreed upon off-site situation, featuring a lake, river, forest, and/or field of study.

The purpose of the Scientists in Residences will be to provide a study of nature. Lake’s inhabitants (microscopic organisms, macroinvertebrate populations, fish communities, and plants) will provide for the biological analysis. The shoreline itself can show in particular the effects. Rivers face their own set of challenges yet provide opportunity for water systems to relay information while showing profound recuperative potential.

When HSC rendezvous with students there is certain expectation for some oohs, uuhs and aahs. The mobile lab will be outfitted with all of the amenities required for the explorations with the solar panels, powering all of the laboratory equipment and enlightening the experience; acting as science exhibit and exploration onto itself.

The goal of each “residence” will be the culminating activity, community fair/showcase/data drive demos. Exhibits, created by the students, on display to demonstrate student’s ability to impact positive change.

**Activity Milestones:**

Description	Completion Date
Choose schools/organization for the Residency. Plan the week/culminating activity/fair.	June 30 2022
Scientists in Residence. 4 days. Culminating Activity. Fall and Winter	January 31 2023
Scientists in Residence. Two residencies in the spring. 8 days. Culminating activities. Spring	May 31 2023
Scientists in Residence. 4 days. Culminating Activities. Fall and Winter	January 31 2024
Scientists in Residence. Two residencies in the spring. 8 days. Culminating activities. Spring	May 31 2024

### Activity 2: Environmental Science Club

**Activity Budget:** \$56,000

**Activity Description:**

HSC will implement an environmental science club for 20 late elementary and middle school students with a focus on environmental science concepts, including watershed evaluation, aquatic invasive species, sustainable communities, and testing of water quality, both fresh and well water. The club will meet 30 times during the school year for 90 minutes and combine hydrologic field work and water quality education. We plan to partner with the Boys and Girls Club of the Bemidji Area to enroll more students, including those from traditionally underserved populations, in the Environmental Science Club. Participants in the program will learn skills by actively engaging in the field and classroom water quality testing.

The environmental science club emphasizes quality contact hours with a cohort of 20 students. This approach will result in 30-35 contact hours per participant and 600 to 650 contact hours per year per cohort. The environmental science club will repeat annually with new cohorts of 20 students for a total of two years. We request two years of funding to implement, evaluate, and establish this effort.

**Activity Milestones:**

Description	Completion Date
Enroll students. Set club activities. Set locations. Plan and schedule projects (final and others).	August 31 2022
Fall/winter club meetings. Final projects.	January 31 2023
Winter/Spring club meetings. Final projects.	May 31 2023

Enroll students. Set course syllabus. Plan and schedule projects (final and others).	August 31 2023
Fall/winter club meetings. Final projects.	January 31 2024
Winter/Spring club meetings. Final projects.	May 31 2024

### Activity 3: Science Class: High School

**Activity Budget:** \$27,500

#### Activity Description:

HSC will implement Environmental Science Class with fifteen to twenty high school students focusing on environmental science concepts, including watershed evaluation, aquatic invasive species, sustainable communities, and water quality testing. HSC will join the high school class, which meets every day (school), to conduct hydrologic field work and water quality education. We plan to partner with Bemidji High School and other local high schools. In collaboration with high school teachers and administrative staff, students will complete science class activities as required work for high school credit. Also, as a part of high school course work, students will complete activities required for Academy learning. Academy is a Bemidji High School program which places high school students in apprentice relationships in area organizations and businesses. HSC will be one of those apprentice sites.

The environmental science club emphasizes quality contact hours with a cohort of 20 students. This approach will result in 50-60 min./week for during the course.

#### Activity Milestones:

Description	Completion Date
Meet with high school teacher. Review course work. Summer Planning	July 31 2022
Enroll students. Set course syllabus. Plan and schedule projects. Fall	August 31 2022
Final Projects Evaluated. End of Course/May	May 31 2023
2nd Year. Enroll Students. Set Course Syllabus. Plan and Schedule Projects	August 31 2023
Final Projects Evaluated. End of Course/May	May 31 2024

### Activity 4: Community Education Classes: Adults and Guests

**Activity Budget:** \$16,500

#### Activity Description:

The Community Education Class HSC will enroll fifteen adult students/guests with a focus on environmental science concepts, including watershed analysis & evaluation, aquatic invasive species awareness, sustainable communities, and water quality testing. The community education class will meet 12 times during the year for 60 minutes and combine hydrologic field work and water quality testing education. Students/guests will learn how to conduct water quality testing, through fresh water samples and studying the inhabitants, including indicator organisms at the micro and macro scale. Samples will be provided for individuals in the class, as well as gathered from the surrounding freshwater locations, i.e. wetlands, lakes, streams, and etc, in other words, from their backyards.

Upon demonstrating high levels of water testing competencies, adults/guests will be able to use the HSC lab, under a Maker Space model. Water samples will be provided by individual participants/adults/guests. Also, on-site testing kits will be made available for checkout by qualified graduates of our programs

The Goals for the Community Education Class are:

Water sampling collection procedures.

Water testing and laboratory procedural skills.

#### Activity Milestones:

Description	Completion Date
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Plan classes, locations (lakes, rivers, forests). Recruit adults, guests, students	August 31 2022
Fall/winter/Spring classes. Final projects. Initiate Makerspace Lab.	May 31 2023
Plan classes, locations (lakes, rivers, forests). Recruit adults, guests, students	August 31 2023
Fall/Winter/Spring classes. Final projects. Initiate Makerspace Lab.	May 31 2024

## Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Andrea Osted	Boys and Girls Club of the Bemidji Area	Andrea is the Executive Director of the Boys and Girls club, who serves nearly 500 children ranging in age from 6 to 18 years old. The Environmental Science Club project would combine staff members from the Headwaters Science Center and our staff from the Club.	Yes
Kristina Van Wilgen-Hammit	Bemidji High School	Kristina is the teacher of the Environmental Science Classes at Bemidji High School. The core purpose of this class is focusing on helping young people further their understanding of the environment and the issues of water quality.	No

## Long-Term Implementation and Funding

**Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?**

In future years, recognizing the value of science education, schools will include the “Scientists in Residence Program” in the school curricula and budgets. Students and participants in environmental science club and classes will pay a nominal fee in subsequent years as a way to continue to offer high-quality science clubs and classes when the grant ends. Field journals will be published, complete with recorded field data. Records will be organized into useful data as contributions on the HSC Citizen Science Page. Field journals will be published on the HSC Webpage, the local, regional newspapers, as well as others.

## Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Developing Youth Watershed Stewardship in Northwest Minnesota	M.L. 2017, Chp. 96, Sec. 2, Subd. 05f	\$121,000

## Project Manager and Organization Qualifications

**Project Manager Name:** Lee Furuseth

**Job Title:** Executive Director

**Provide description of the project manager’s qualifications to manage the proposed project.**

Lee Furuseth has thirty-seven years working in K-12 public education. Seventeen years as a teacher, mostly as an elementary classroom teacher, and twenty years as an elementary principal. On June 30, 2018, Lee retired from public education and shortly after retiring, joined the staff at the Headwaters Science Center (HSC) as the Executive Director (ED). Lee has been on board for the nineteen months, managing day-to-day operations, managing a current LCCMR grant, which was extended to June 30, 2021 and will expire on that date, as well as managing additional grants, including a grant from the Minnesota Department of Education totaling \$100,000 over two years. Lee's background managing grants spans twenty years as a building principal with grants exceeding \$800,000. Lee's experiences with managing staff include twenty years as a building administrator, with fourteen years at the Walker-Hackensack-Akeley (WHA) Elementary School, with direct supervision of more than fifty staff. Additionally, Lee managed the Bagley Elementary School with food service, custodial, transportation, security, teachers, counselors, and non-certified instructional staff, totally more than seventy employees. Besides supervision responsibilities of staff and management of grants, Lee had direct managerial responsibilities of a budget ranging from \$300,000 to \$400,000. The student population at WHA

ranged from 300 to 400 students. The Bagley student population hovered around 550 students during Lee's six years as principal.

**Organization:** Headwaters Science Center

**Organization Description:**

In 1994 a group of highly dedicated science professors, teachers and concerned members of the Bemidji community and Northern Minnesota formed an action group to establish a science center for the citizens of Northern Minnesota. This group of leaders in science education were led by Doctors Laddie and Jim Elwell, who served the Headwaters Science Center (HSC) for seventeen years as the Executive Director and the Chief Financial Officer respectively. What started as a dream in 1994, grew and flourished, and now HSC is a testament to their passionate dedication to science. HSC stands as the only science center from the Twins Cities to Winnipeg and from Fargo to Duluth. The Headwaters Science Center is accredited by the Association of Science and Technology Centers (ASTC) and joins the more than 300 ASTC science centers in the United States and the world.

HSC serves the communities of Northern Minnesota. While seventy-five percent of the members have addresses in Bemidji and Beltrami County, guests and visitors travel from 150 miles in all four directions from HSC. The mission at HSC is "Science You Can Touch". More than 30,000 guests and visitors experience the demonstrations, exhibits and instruction kits each year.

## Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	\$ Amount
<b>Personnel</b>								
Lead Teacher: Teaching and Learning		Responsibilities: both direct and indirect for all four activities. Coordinate implementation. Design Scope and Sequence. Teach in all four activities.			7%	0.38		\$19,400
Teacher(s)		Direct Instruction. Instruction in Environmental Club, Environment Class, and Community Ed. Adult Class			7%	0.9		\$38,200
							<b>Sub Total</b>	<b>\$57,600</b>
<b>Contracts and Services</b>								
Boys and Girls Club of Bemidji	Professional or Technical Service Contract	Environmental Science Club is a club done in cooperation with the local Boys and Girls club. Students are members of the B and G Club. One staff person from B and G will accompany students to the science club site and assist with all activities.				0.2		\$10,000
							<b>Sub Total</b>	<b>\$10,000</b>
<b>Equipment, Tools, and Supplies</b>								
	Equipment	Camera, Tripod, Case, Accessories. (1)	Record presentations, Film for Social Media, Record Forums, Record Projects (pictures and videos)					\$600
	Equipment	Chloride Probe (3)	Water Testing Equipment (1)					\$2,700
	Equipment	Chloride Standard and Solution (8)	Water Testing Equipment					\$600
	Equipment	Nitrate Probe (2)	Water Testing Equipment					\$1,900
	Equipment	Nitrate Standard and Solution (5)	Water Testing Equipment					\$500
	Equipment	HQ40D Meter (1)	Water Testing Equipment					\$1,200
	Equipment	HQ40D Field Rugged PH Probe (4)	Water Testing Equipment					\$3,000
	Tools and Supplies	Nitrate Nitra Ver 3 (6)	Water Testing Reagent Supply					\$300
	Tools and Supplies	Nitrate Nitra Ver 6 (5)	Water Testing Reagent					\$300



	Tools and Supplies	Phosphate Phos Ver (12)	Water Testing Reagent					\$400
	Tools and Supplies	Amber Samples (10)	Water Testing Plastic Bottles					\$350
	Tools and Supplies	Goggles (50)	Eye Protection					\$200
	Tools and Supplies	E coli/coliform testing kits (10)	Supplies for water testing.					\$1,700
	Tools and Supplies	Kim Wipes (5)	Wipes					\$150
	Tools and Supplies	Petri Dishes (12)	Water Testing Supplies					\$400
	Tools and Supplies	Parafilm (7)	Vial Sealer					\$200
	Tools and Supplies	Dissection Kits (65)	Perform Dissection Procedures					\$1,000
	Tools and Supplies	Dissection Trays (65)	Perform Dissections					\$800
	Tools and Supplies	Beakers, Flasks, and Vials (Misc. 500)	Water Testing					\$500
	Tools and Supplies	DR 900 Cuvettes (60)	Water Testing Supplies					\$1,000
	Tools and Supplies	Ferro Ver (6)	Water Testing Reagent					\$200
	Tools and Supplies	Pipette Tips (12)	Water Testing Supplies					\$400
	Equipment	HQ40D Standards (2)	Water Testing Equipment					\$200
	Equipment	HQ40D Conductivity Probe	Water Testing Equipment					\$1,700
	Equipment	HQ40D Rugged Dissolve Oxygen Probe (2)	Water Assessment					\$4,400
	Tools and Supplies	DO Replacement Membranes (10)	Water Testing Supplies					\$1,400
	Equipment	Concession Window	Quick and easy access to trailer equipment and supplies					\$1,000
	Tools and Supplies	Paint and decals for trailer	Mobile Lab paint and decals.					\$400
	Equipment	Benches, counters and carts for trailer	Moving and storing equipment					\$2,500
	Equipment	Electric Conduit. upgrades, wire, RV outlets, AC outlets	Outfit mobile lab trailer					\$300
	Equipment	Solar Panels	Trailer power source					\$1,200
	Equipment	Solar Charge Controller	Power for Trailer.					\$600

	Equipment	Brackets 100 Watts (4)	Equipment for the power in the trailer					\$600
	Equipment	Connectors and Relays (4)	Outfit trailer with power					\$200
	Tools and Supplies	24 to 12 Volt converter	Battery accessory					\$100
	Equipment	12 Volt Deep Cycle Lead ACID Battery (2)	Store power in trailer					\$500
	Equipment	24 Volt no-maintenance quick charge Lithium ion	Battery power source storage.					\$1,000
	Equipment	DR 900 Multiparameter Portable Colorimeter (2)	Water Testing					\$3,200
	Equipment	HQ40D Field Rugged Conductivity Probe (3)	Water Testing					\$3,000
	Equipment	HQ40D Calibration Standards (ph Conductivity	Water Testing					\$400
	Equipment	Incubator, Hach Portable 12 DC 30-50 c	Testing equipment. Incubate samples.					\$1,400
	Tools and Supplies	Culture Incubator Power Supply 110-240 VAC 12 V AC-DC	Power supply for Hach portable incubator.					\$600
							<b>Sub Total</b>	<b>\$43,100</b>
<b>Capital Expenditures</b>								
		Trailer MG 7 X 14	Mobile Lab. House all equipment. Bring lab to schools, lakes, rivers, and etc...					\$6,500
							<b>Sub Total</b>	<b>\$6,500</b>
<b>Acquisitions and Stewardship</b>								
							<b>Sub Total</b>	<b>-</b>
<b>Travel In Minnesota</b>								
	Miles/ Meals/ Lodging	Miles to and from scientist in residence locations: school, lakes, rivers, and etc..	Mobile lab site.					\$15,000
							<b>Sub Total</b>	<b>\$15,000</b>
<b>Travel Outside Minnesota</b>								
							<b>Sub Total</b>	<b>-</b>
<b>Printing and Publication</b>								
	Publication	Website maintenance and submission.	Publication of presentations					\$1,800

4/7/2021

							<b>Sub Total</b>	<b>\$1,800</b>
<b>Other Expenses</b>								
							<b>Sub Total</b>	<b>-</b>
							<b>Grand Total</b>	<b>\$134,000</b>

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
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Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	-
Non-State				
			Non State Sub Total	-
			Funds Total	-

## Attachments

### Required Attachments

#### *Visual Component*

File: [f6608dba-a19.pdf](#)

#### *Alternate Text for Visual Component*

Three scientists (apprentices) gathering water samples....

#### *Financial Capacity*

File: [3453a82e-2ba.pdf](#)

#### *Board Resolution or Letter*

Title	File
Board Resolution 2022	<a href="#">43079cc8-4fe.docx</a>
HSC 2019 990	<a href="#">7d4e2d1f-a3d.pdf</a>

### Optional Attachments

#### *Support Letter or Other*

Title	File
Community Education Bemidji	<a href="#">fe133edf-ee9.docx</a>
Leech Lake Area Boys and Girls Club	<a href="#">7eba2f46-ba5.docx</a>
Bemidji High School Letter	<a href="#">b13703ea-280.docx</a>
Boys and Girls Club of Bemidji	<a href="#">34fbd410-8dc.docx</a>

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Does your project have potential for royalties, copyrights, patents, or sale of products and assets?**

No

**Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?**

N/A

**Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?**

N/A

**Does your project include original, hypothesis-driven research?**

No

**Does the organization have a fiscal agent for this project?**

No







